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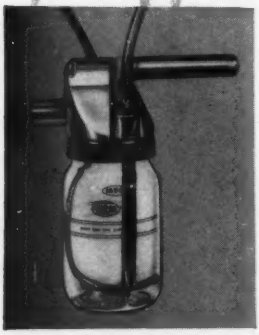

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***An Aerosol Method of Producing Bronchial Secretions in Human Subjects; a Clinical Technique for the Detection of Lung Cancer*, Hylan A. Bickerman, MD, FCCP; Edith E. Sproul, MD, and Alvan L. Barach, MD, FCCP. Paper read before 23rd annual meeting of American College of Chest Physicians in New York City, June 15, 1957.**

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VOL. 3 NO. 4

inhalation therapy

DECEMBER 1958

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JOURNAL OF THE AMERICAN ASSOCIATION OF INHALATION THERAPISTS

EDITORIAL OFFICE
260 Crittenden Blvd.
Rochester 20, New York

Editor
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Managing Editor
ALBERT CARRIERE

Staff Artist
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ASSOCIATE EDITORS
DON E. GILBERT
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PRODUCTION OFFICE
332 South Michigan Ave.
Chicago 4, Illinois

Production Manager
DAVID MARSHALL

ADVERTISING REPRESENTATIVE
Samuel N. Turiel & Associates, Inc.
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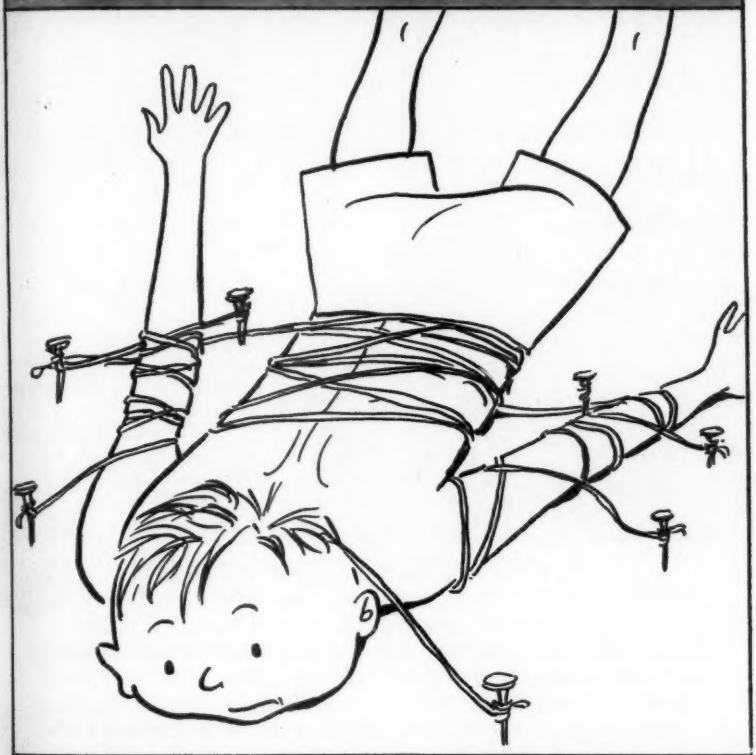

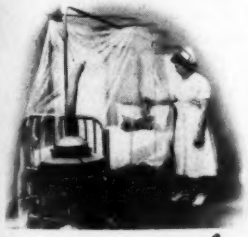

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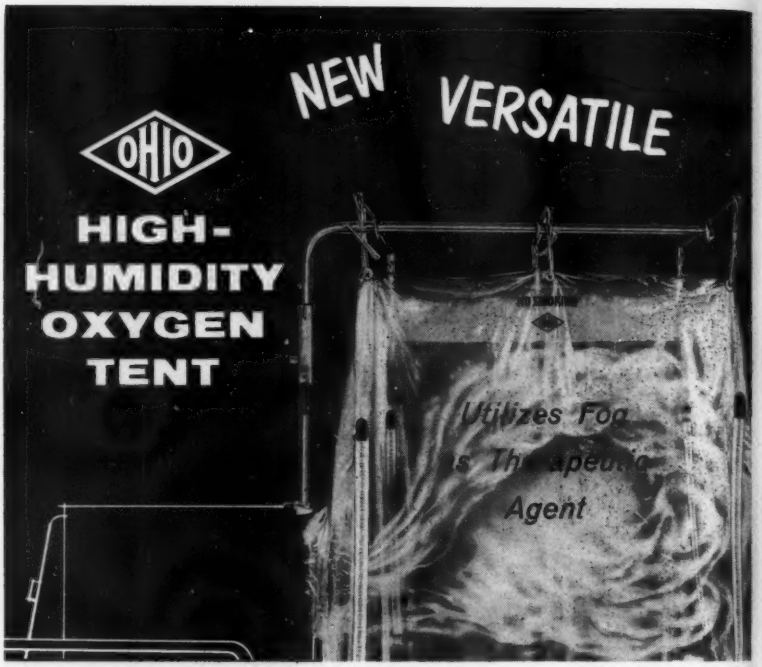

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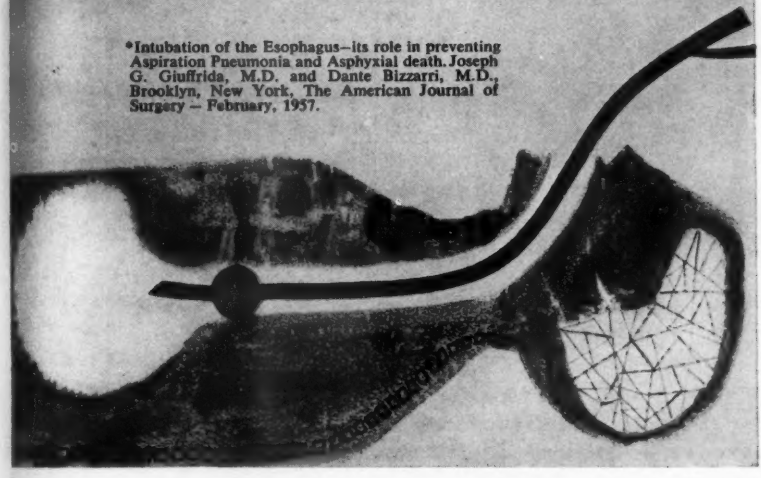
*Intubation of the Esophagus—its role in preventing Aspiration Pneumonia and Asphyxial death. Joseph G. Giuffrida, M.D. and Dante Bizzarri, M.D., Brooklyn, New York, The American Journal of Surgery – February, 1957.



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Editorial

New Horizons

FROM its early inception prior to World War II, the practice of inhalation therapy has made tremendous strides resulting in the ever increasing awareness of the value of this form of therapy in almost every branch of medicine.

For the most part, this advance has taken place as a sort of "by-product" of research involving many disciplines: physiology, bacteriology, physics and engineering, to mention a few. It takes little imagination to visualize this growth when we compare the range of therapy in a modern inhalation therapy department today with the sole function of such a department two or more decades ago—that of dispensing oxygen to the moribund patient.

Yet because inhalation therapy is a by-product of research and new fields are constantly being unfolded, we continue to grow and must inevitably suffer "growing pains." To illustrate, perhaps the term *inhalation therapy* is becoming too narrow and restrictive. Many of our new techniques are not solely designed to "treat" patients in the strictest sense of the word, but are useful in the diagnosis of various disease states. For example, the new superheated aerosols which are being studied by Drs. Alvan L. Barach, Gustav J. Beck and myself were originally designed with the idea of obtaining sputum for the detection of lung cancer by cytologic examination in subjects who had no cough or spontaneous sputum. It is quite obvious that the same technique could be useful in establishing the diagnosis of bacterial or fungal diseases of the lung by appropriate bacteriologic study.

Furthermore, even the term *inhalation* may be too restrictive. In the overall management of patients with pulmonary emphysema, bronchial asthma, pulmonary fibrosis, etc., certain forms of breathing exercises have been of

considerable advantage in rehabilitating these patients. The well-trained inhalation therapy technician with a good background in respiratory physiology is perhaps better suited to aid in such a program of retraining than the physiotherapist.

It is not too visionary to expect that the new techniques resulting from engineering research may supplement and even supplant many of our present day methods of administering gases and aerosols in the near future. New devices which are research tools today become the clinical instruments of tomorrow. The fields of pressure breathing and mechanical aids to respiration illustrate the rapidity of progress from the laboratory to the bedside.

Finally, while we accept the administration of therapeutic gases and aerosols by inhalation, would it not be possible—even feasible—to administer certain drugs by inhalation? The lungs have a vast capillary network, and a drug which could be absorbed across this capillary membrane would act as though it had been given intravenously. There could be a considerable advantage, particularly with those drugs that are ineffective when given by mouth because of gastric inactivation, such as insulin or heparin.

These thoughts express only a few of the new advances which will inevitably occur in the field of inhalation therapy. In order to grow with our profession, it becomes imperative that we establish a good background in the basic sciences applying to the practice of inhalation therapy. Keeping up-to-date will lessen to a considerable degree some of the growing pains. And at the same time, the therapist will have the satisfaction of knowing his patients are receiving the best service available.

—Hylan A. Bickerman, M.D.

AMERICAN ASSOCIATION OF INHALATION THERAPISTS

THE AMERICAN ASSOCIATION OF INHALATION THERAPISTS is an organization of therapy technicians working: in hospitals, for firms providing emergency therapy service, and for municipal organizations. The Association is sponsored jointly by the American College of Chest Physicians and the American Society of Anesthesiologists.

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Why oxygen helps the patient in congestive heart failure

by Vincent J. Collins, M.D.

CERTAINLY one of the sickest patients the inhalation therapist has occasion to see is the one with congestive heart failure.

His symptoms usually include cyanosis, shortness of breath, nausea, vomiting and pain; often shock and/or pulmonary edema as well. He is a real challenge to the physician *and* the inhalation therapist.

Congestive failure is not a disease itself; it is a sign of any of several anatomical abnormalities or pathological processes: intrinsic myocardial disease, hypertension (the heart has to work increasingly harder to oppose mounting pressure in systemic circulation), rheumatic heart disease (tightening up of valves interferes with flow of blood through the heart), thyrotoxicosis, coronary artery disease (myocardial infarctions), etc.

Despite all these causes, there is a common picture. There is a lowered arterial and venous oxygen saturation, and right here we have indication for oxygen therapy. As the heart fails, the blood pressure falls, and this causes stagnant hypoxia in the outlying tissues. This combination of conditions predisposes to shock.

Also, there is congestion of the lungs with blood. This decreases the amount of space available for air, which interferes with oxygen uptake and with the mixing of gases. The poor mixing of gases leads to carbon dioxide retention and respiratory acidosis. Congestion of the lungs with blood also decreases the circulating blood volume, which reduces the effective oxygen-carrying power of the blood.

Tissue edema occurs

Often there is development of edema in the general body tissues and in specific organs like the kidney, liver, and the lungs. The tissue edema blocks oxygen uptake (a form of histotoxic hypoxia), further impedes circulation and enhances stagnant hypoxia. Edema of the liver and kidneys very much impairs their vital functions.

Pulmonary edema is in contradistinction to the congestion of the

Dr. Collins is Associate Professor of Anesthesiology at New York University; a member of the American Society of Anesthesiologists, and is on the Board of Advisors of the AAIT.

lungs. The congestion is an engorgement of the vessels with excess blood; the edema is fluid which has actually escaped from the vessels into the alveoli, and which further encroaches on the surface available for oxygen uptake. This can be regarded as a type of atmospheric hypoxia, in the sense that it interferes with oxygen from outside entering the blood stream.

So in this one pathological condition—congestive heart failure—we find three types of hypoxia; histotoxic, stagnant and atmospheric. Oxygen therapy is hence without doubt one of the first and most important things that should be given such a patient.

Before getting into the specific treatment, however, it would be well to establish three principles which apply equally well to all inhalation therapy.

Relationship important

The *first principle* is the matter of the relationship between the doctor and the therapist (or any paramedical service). When the doctor orders a service which the inhalation therapy department renders, the therapist becomes a consultant to the doctor, much as the anesthesiologist does to the surgeons and medical men whom he serves.

It must be remembered that the consultant can advise and/or recommend, but that *it is the doctor who does the ordering.* If he specifies something, the therapist is obliged to go ahead and provide that service, unless he can *tactfully* persuade the doctor that there may be a better way of accomplishing the desired end.

The *second principle* is that the therapist is in a marvelous position to apply a little psychology. This is especially important with cardiac patients, but helpful with many others too.

Fear must be overcome

Until recently, the majority of patients when told they were going to have some form of oxygen therapy thought, "Well, this is a ticket to the other world." This is a fear which we must overcome, and it is necessary to allay the fears of the physician too, in some instances. There are many doctors today of the "old guard" who still think, "This is a measure of desperation." We must convince these men that *this is a technique to make patients progress more rapidly.*

The *third principle* point to be emphasized is that there are indications and contra-indications. Just because a patient is labelled as one with a cardiac disease, that does not mean that he automatically needs oxygen or other inhalation therapy. It depends on whether there are certain other attendant circumstances.

Oxygen not needed

Let's say that a man has a rheumatic heart disease. There may not be any indication for oxygen at all, unless there are associated complications. Maybe there is pain; maybe there is congestive failure; maybe there is pulmonary edema —these are indications for inhalation therapy; rheumatic heart disease *per se* is not.

To return to our patient in congestive failure, if cyanosis is not marked, a nasal catheter usually

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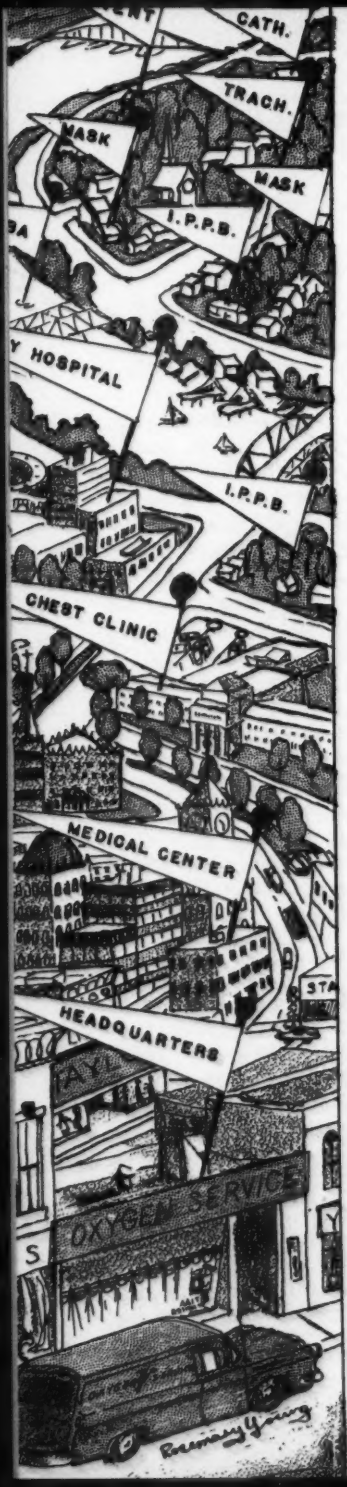


Organizing a profitable oxygen therapy service

by Lawrence E. Ross

ORGANIZING a profitable oxygen therapy territorial service is far different from supervising a hospital's oxygen therapy department.

No generalities about the six fundamental steps necessary for success can fit all situations, but they may be helpful.

In the fall of 1955 I first started such a service. I anticipated little difficulty since I had for the preceding four years been oxygen therapy supervisor of a large Florida hospital. I found that an oxygen therapy service company is quite different.

I was accustomed to having doctors call me for advice and had everything at my finger tips for immediate use. This, I soon learned, is *not* the pattern in the home rental service business.

It was first necessary to convince the doctors that I could give good service and correctly administer therapy in their patients' homes. This was a slow process.

Doctors are very busy men and don't have time to visit with others than their patients. I had to convince the doctors that I was a qualified oxygen therapist not only interested in getting their oxygen rentals and sales of equipment, but also in providing them home oxygen therapy service of professional quality.

The next step was to set up an operations base

Mr. Ross is administrative assistant, Baptist Hospital, Nashville, Tennessee.

and a mobile unit—quite different from fitting a hospital department. A suitable half-ton panel truck is needed to transport large cylinders, oxygen tents, and all the paraphernalia that goes with them. The truck needs to be fully equipped with all types of oxygen appliances for every use. Basic equipment should include at least one set-up each for catheter, cannula, mask and tent; and a resuscitator will come in very handy at times, often saving you a trip back to the store.

To avoid breakage and for complete cleanliness, these items must be kept wrapped, and preferably stored in built-in cabinets. Equipment which has been left at a patient's home must be replaced in the truck immediately to avoid making the next run without the one article you need most—the one you left behind.

You need card files

The third step is the office work, which most of us dislike. But it all is necessary and it isn't quite so bad when you keep a complete inventory of all gases and equipment on card files. You also need cross-index files on all customers, listing the equipment and gas being used on each case, by whom it was ordered, the type of appliance, the liter flow, and any other information pertinent to the case. It is important to be able to find immediately each individual's card, complete in every detail since much of your work is handled over the phone: Acquainting doctors with progress, making checks of equipment with the patient and his family, and such. Many times, long trips to correct an appliance can be avoided. by making sure the patient or his attendants understand the oxygen set-up in use.

Another essential is good office help. Someone who is already experienced in typing, filing, bookkeeping and handling visitors and phone calls should be trained on the various types of equipment your company provides. Thus when you are out, your office will be able to accept intelligently the orders from doctors and relay them to you, saving lost time and unnecessary expense of running back and forth to your office. Well-trained office personnel can handle many calls from your customers about "what should I do now, this 'thingamajig' won't work."

The fifth step is to help all the hospital administrators in your area —first therapeutically, then financially. At first help them to set up a training program for their personnel. Then show them that an oxygen therapy department is a necessity. All this helps a territorial service company get started, because you then can sell or rent equipment to the hospitals.

You should make it a point, too, to get acquainted with all the leading doctors and scientists in your area who are interested in respiration research, such as doctors in charge of pulmonary function testing laboratories. These men can open doors and set up appointments with practicing doctors that would in many instances take months for you to do working alone.

Finally, train some field personnel. They will be needed almost immediately, since one person cannot cover 24-hour service alone, and when business is brisk, it is not always possible even to cover

concluded on page 36

AAIT names Gilbert president; Sister Yvonne board chairman

Group will meet in Philadelphia in 1959; Minneapolis in 1960

by James F. Whitacre

THE American Association of Inhalation Therapists' Annual Meeting and Lecture Series in 1959 will be held in Philadelphia and that in 1960 in Minneapolis.

Those were the cities chosen by the Board of Directors at its meetings in St. Louis during the fourth annual convention of the AAIT.

At the annual business meeting, the membership chose Don Gilbert, supervisor of inhalation therapy at University Hospital, Ann Arbor, Michigan, as president, and Sister M. Yvonne, F.S.P.A., director of the school of anesthesia of St. Francis Hospital, La Crosse, Wisconsin, was named chairman of the board.

This annual meeting was the most successful yet held. More than 230 persons attended, among them 64 men and women representing 21 exhibiting companies, some 20 representatives of service companies, and about 120 AAIT members.

A feature of the meeting was the charter presentation to the Southern California chapter, making it the 15th chapter. Also, more than two-score applications for membership were acted upon by the membership committee.

The members completed their slate of officers by electing Larry Fruik, supervisor of inhalation therapy, Edgewater Hospital, Chicago, as first vice president, and Noble Price, supervisor of inhalation therapy, Methodist Hospital, Indianapolis, Indiana, as second vice president. Mrs. Agnes Forrest, inhalation therapist, Edgewater Hospital, was re-elected treasurer.

Other new board members chosen were: Sister M. Arnoldine, R.N., inhalation therapy supervisor, Holy Family Hospital, LaPorte, Indiana; Larry E. Ross, administrative assistant, Baptist Hospital, Nashville, Tennessee; Bernard Kew, supervisor of inhalation therapy, St. Alexis Hospital, Cleveland, Ohio; and Joseph L. Klocek, R.N., supervisor of inhalation therapy, Presbyterian Hospital, New York, New York.

Continuing board members are: Jack Sharkey, supervisor of inhalation therapy, Queen Mary Veterans' Hospital, Montreal, Quebec;

Mrs. Leah Tharaldson, R.N., supervisor of inhalation therapy, Northwestern Hospital, Minneapolis, Minnesota; Mrs. Constance Cypert, supervisor of inhalation therapy, Inter-Community Hospital, Covina, California; Bruce Boyd, supervisor of inhalation therapy, Jackson Memorial Hospital, Miami, Florida; and James F. Whitacre, supervisor of inhalation therapy, Strong Memorial Hospital, Rochester, New York.

This year's convention included several unique features. There were special sessions for service company members, and nine hours of equipment clinics where service members could talk with manufacturers' representatives about specific equipment problems.

Membership has merit

Max Glasser, of Professional Oxygen & Equipment Service Company, Miami, Florida, said these sessions were intended to show service company people the advantages of AAIT membership along with participating in clinics and panel discussions on service company problems. Mr. Glasser led a discussion on "Liabilities, Leases and Contracts."

William Clothier, of Mooney's Oxygen Service, Wilkes-Barre, Pennsylvania, who was moderator of the session on "Manufacturer Relations, Supplies and New Equipment," stated that the dealer's role, like the therapist's, is fundamentally one of service. He has the same responsibility to keep himself abreast of latest developments. Manufacturers have cooperated beautifully, he said, by setting up research and development departments for design of new equipment. Some have gone further and provided consultation services to handle individual problems.

Other service discussion leaders and their topics were: C. R. Mann, of Oxygen Therapy Service, Tampa, Florida, on "Business Problems, Public Relations and Records"; S. B. Pendley, of Pendley's Oxygen Therapy Supply, New Orleans, Louisiana, on "Deliveries, Trucks, Personnel, Cylinders and Piping"; and J. Howard Newell, of American Medical Oxygen Service, Hammond, Indiana, on "Service Members in Hospitals."

Roundtable discussions were another new attraction this year. They were designed to involve more therapists in direct participation than is possible in the conventional lecture.

Eight topics covered

Separate groups discussed these eight topics: Records and Charges; General Maintenance and Storage; The Nurse's Role; Schools and In-Service Training; Service Members' Problems; Chapters—Organization and Projects; Basic Techniques; and Physiological Aspects and Medical Supervision. Following the discussion, table leaders formed a panel and each reported the gist of his group's thoughts. A general question and answer period followed.

Mrs. Tharaldson arranged these roundtables and was the general moderator. The discussion leaders included: Dr. N. K. Jensen, clinical associate professor of surgery, the University of Minnesota; Alois Holzer, supervisor of inhalation therapy, St. Alexius Hospital, Bismarck, North Dakota; James E. Peo, R.N., supervisor of inhalation therapy, Delaware Hospital, Wilmington, Delaware, and immediate past-president of the AAIT; George Wells, vice president, A.B.C. Oxygen Service Company, Minneapolis; Sister M. Yvonne; Merriam Adams, R.N., associate director of nursing service, Northwestern Hospital, Minneapolis; John House, midwest manager, oxygen therapy service, the Linde Company; and Mrs. Julia Craigie, chief inhalation therapist, Northwestern Hospital, Minneapolis.

Gas mixtures discussed

Panel discussions were features on two days. Dr. Robert B. Dodd, head of the division of anesthesiology, Washington University School of Medicine, St. Louis, Missouri, headed a panel on gas mixtures, discussing uses of 100% oxygen. Dr. Albert H. Andrews, director of the respiratory laboratory, Presbyterian-St. Luke's Hospital, Chicago, Illinois, discussed air-oxygen mixtures, Dr. Albert Roos, chief of laboratory of thoracic physiology, Washington University School of Medicine, spoke on CO_2-oxygen mixtures, and Dr. William F. Miller, director, pul-

continued

monary division, department of internal medicine, University of Texas Southwestern Medical School, Dallas, Texas, talked about helium-oxygen mixtures. Dr. Miller commented that since helium seems not to be universally effective in all obstructive disorders, we need research to reveal which types are most relieved by it.

Mrs. Cypert moderates

The panel on "Education and Schools for Therapists" was moderated by Mrs. Cypert, who has set up a 24-month course at Mt. San Antonio College which will give its graduates an Associate in Arts Degree and a certificate from the Inter-Community Hospital in Covina. These therapists will be able to work on a supervisory level.

Allen Claghorn, of the Linde Company, who is on the faculty of the St. Elizabeth Hospital School for Inhalation Therapists, at Elizabeth, N.J., described the curriculum there.

Walter L. Jones, of the UCLA medical center, also was on this panel. Mr. Jones was founder and technical head of a therapists school at the Hospital of the University of Pennsylvania in Philadelphia, and has gone to UCLA to set up a similar school there. He feels there should be three levels of training: technician, therapist and technologist. Training periods required for these three classes would be 6, 12, and 24 months, respectively, with 1,000 hours of theory and practice to each six months.

Mrs. Tharaldson also contributed valuable information and suggestions on this panel.

High standards a must

Another first-time subject this year was that of "Legal Problems of Inhalation Therapy."

William E. Hartnett, of Riordan & Brown, attorneys, Chicago, said that now we are becoming "professionals" and can be subject to *malpractice* or *negligence* suits the same as doctors and nurses. Not much legal data has been amassed on inhalation therapists yet, but this is coming, and we must expect to have to consider malpractice insurance just as other professionals do, he said. Rigid adherence to ethical standards, and conscientious attention to advances in the field are musts if we are to conduct service which is above reproach.

The annual meeting and lecture series always features addresses by doctors on medical topics of fundamental importance to all therapists, experienced or not.

The first of these was by Dr. Edwin R. Levine, director, department of inhalation therapy, Edgewater Hospital, speaking on "The Physiologic Basis for Inhalation Therapy." Most respiratory disorders commence in the bronchi, he said, so attention must be focussed on the nature of the tracheobronchial tree and how it can be obstructed, and what we as therapists can do to help overcome this obstruction.

The program also included lectures by Dr. Roy H. Behnke, associate professor of medicine, Indiana University Medical Center, Indianapolis; Dr. Herbert B. Zimmerman, chief, cardiopulmonary laboratory, The Jewish Hospital of St. Louis; and Dr. Mario B. Pianetto, physician II, Robert Koch Hospital, Koch, Missouri. Dr. Behnke spoke on "Breathing Exercises for Chronic Respiratory Cases."

Diaphragm is hampered

These are an effort at restoration of diaphragmatic function. The diaphragm itself is not diseased, but changes in the chest hamper its operation. The use of abdominal muscles to help the diaphragm rise during expiration was discussed, as was the technique of employing the weight of abdominal viscera to help by tipping the head and feet downwards alternately. Dr. Behnke said he feels abdominal belts are usually effective only after the patient has learned to do exercises which they help re-inforce. One of the simplest and yet very effective exercises the patient can do is pursed lip exhalation, which provides sufficient expiratory positive pressure to keep bronchi open.

Dr. Zimmerman's subject was "High Humidity and Aerosols in Inhalation Therapy."

Dr. Pianetto, discussing "Long Term Therapy," remarked that tuberculosis is "no longer a spectre of doom," as it is now controllable with Streptomycin, Paraminosalicylic acid and Isoniazide.

Dr. George A. Saxton, senior physician, respiratory center, University of Illinois, Chicago, talked on "Artificial Respiration Through a Tracheotomy Tube." He favors

the application of positive pressure to the tube, rather than negative pressure applied around the thorax as in tank or cuirass respirators. The advantages and disadvantages of cuffed and uncuffed tracheotomy tubes were discussed, along with considerations of several types of machines for applying the pressure to them.

"Bronchiolitis" was presented by Dr. Andrews. His remarks gave a better understanding of the nature of the disease and what forms of therapy are likely to be helpful and why.

Meneely talks on testing

Dr. George R. Meneely, associate professor of medicine, Vanderbilt University, Nashville, Tennessee, gave an analysis of "Practical Pulmonary Function Testing," the general purpose of which is to detect functional impairment, its extent and its severity. Practical limitations to the extent of a function testing program are instrumental resources, and skill and time of medical and technical staff available, he said. Critical analysis must be made of these factors in relation to the contemplated testing program, after which equipment and other facilities can be selected which most efficiently meet the requirements, he stated.

Dr. Herbert C. Sweet, director, pulmonary laboratory, St. Louis University, spoke on "IPPB Therapy in Emphysema." Dr. Sweet reviewed a study of 50 emphysematous patients using IPPB in their homes over periods of one to four years. Pulmonary function studies made before and at intervals during this time showed definite improvement in a few, but the majority remained the same, and "patients continued to run the usual course of emphysema." The important point, however, was that *the amount of time it was necessary for these patients to spend in the hospital has been much less with IPPB in the home than it was before this was instituted,* he said.

A convention highlight was the evening field trip to Dr. Sweet's pulmonary laboratory at Firmin Desloge Hospital, where equipment was demonstrated and discussed. A movie on cardiac catheterization was shown.

The sessions also included talks by Dr. Edwin Emma, chairman, committee on inhalation therapy, The American Society of Anesthesiologists, Inc., Hewlett, New York, and Sister Borromea of Escanaba, Michigan. Dr. Emma, a member of the AAIT Advisory Board, spoke on "Why the American Society of Anesthesiologists is Acting as Joint Sponsor for the AAIT."

Anesthesiologists supervise inhalation therapy in many hospitals, and so they are interested in getting competent personnel, he said. They see in the AAIT a possible source of better personnel, so they are interested in helping the Association develop. The free association and interchange of ideas fostered by the national organization and its chapters are also necessary to the development of the field, he said.

Sister Borromea, a past president of the AAIT, gave an inspirational talk on the "History and Future of the AAIT." She called attention to the code of ethics and the editorial on the professional attitude which have appeared in this Journal, and urged that we re-read them and be guided by them. We should keep constantly in mind, she said, that our only excuse for being—the only excuse of the Association, the industry, and the individual therapist, for being — is *better patient therapy.*

Reports on essentials

Dr. John Hinman, assistant secretary, council on medical education and hospitals, American Medical Association, Chicago, gave a "Report on Standards of Education and Training and Establishment of Schools." He described the proposed essentials for acceptable schools of inhalation therapy which would be used as a "guide" and the voluntary registrary for inhalation therapists.

Talks by active and industrial members filled out the remainder of the week's schedule. One session considered "The Therapist's Place in his Organization," with Sister M. Blanche, Good Samaritan Hospital, Zanesville, Ohio, discussing the "Therapist and the Nursing Service," Mr. Whitacre speaking on "The Therapist and the Physician," and Dr. Emma describing the relationship between "The Therapist and the Anesthesia Department."

"Safety in Oxygen Therapy" was urged by John J. Hennessey, manager, medical gas division, Welding Gas Products

continued

Company, Chattanooga, Tennessee, who stressed the danger of fires in tents. This was followed by LeRoy Fortner of National Cylinder Gas Division of Chemetron Corporation, Chicago, who described "Industry's Part in Inhalation Therapy Research." Mr. Fortner pointed out that not only is inhalation therapy expanding as a paramedical specialty field, there is an increasing complexity being demanded of equipment. Industry is accepting this challenge and turning out more complex apparatus. He made the point that it is the therapist's

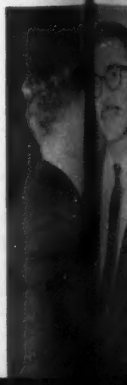
David Marshall, AAIT convention manager, checks over exhibit notes with John A. House of the Linde Company.

Dr. Archibald O. Tetzlaff, left, talks with Dr. George R. Meneely, Vanderbilt University, and Major Nestor M. Hensler, M.D., Scott Air Force Base, about Dr. Meneely's paper, "Practical Pulmonary Function Testing."

Learning ... new equip... L. Robert C...

Don E. Gilbert, president; James E. Peo, R.N., immediate past president; Larry Fruik, first vice president; Mrs. Leah Tharaldson, R.N., board member; Sister M. Yvonne, F.S.P.A., board chairman; and Mrs. Agnes Forrest, treasurer.

Herbert B. Z... and Mario ... Missouri ...



staff photos by
James F. Whitacre

"responsibility to gain the fullest possible understanding of this new equipment, and the new techniques it makes possible."

Mr. Fruik addressed the group on "Greater Efficiency through Record Standardization."

The registrants were welcomed to St. Louis by Dr. David N. Kerr, vice president of the St. Louis Medical Society.

Other features of the convention were exhibits of the equipment of 21 manufacturers, and films on various aspects of inhalation therapy.

Dr. Herbert C. Sweet of St. Louis awaits a question following his speech on "IPPB Therapy in Emphysema."

...nt of Mist O_2 Gen, were Mrs. Adeline S. ... and C. R. Mann, both of Tampa, Florida, ...ward A. Turner, Charlotte, North Carolina.

J. J. Esop, center, raises a point with Dr. Robert B. Dodd, while Drs. William F. Miller and Albert Andrews listen to J. H. Emerson by bulletin board.

...y discussed "High ... and Aerosols" ...ong Term Therapy."

Among chapter delegates attending were, seated: Walter Palmer, William Milliken and J. Addison Young; standing: Earl Hockman, B. J. McCluskey, Ben Rosa, Leonard Gurney and Jerome Heydenberk.

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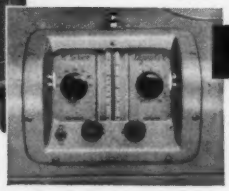

Lighted Control Panel

note oxygen flowmeter (center), temperature and ventilation controls (left and right), oxygen controls (bottom).

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continued from page 13

provides enough oxygen. Within 10 or 15 minutes dusky nailbeds will pink up. If there is pronounced cyanosis or dyspnea, mask oxygen is indicated because of the higher concentration possible with this form.

Must use oxygen

If pulmonary edema develops, positive pressure oxygen must be resorted to in one form or another. In extreme cases it must be used continuously throughout inspiration and expiration; but in these instances, it is of paramount importance that the treatment be closely supervised by a physician with full knowledge of the possible consequences, because if the pattern of positive pressure breathing is altered inappropriately, there will be decreased venous return and failing cardiac output, resulting in a worse situation. As soon as the acute episode is past, it is best to convert to a mask with positive pressure on expiration only.

Use of the Positive Pressure Mask. Most of these masks are designed with four vents on the expiratory valve. Do not start off with the dial set on the smallest hole! Start on one of the largest ones and gradually work into the higher pressures as the patient becomes adjusted. The pressure should be increased *only as the patient tolerates it,* and it is unnecessary to increase it beyond an adequate response. That is, one does not need to resort to 4 cm pressure if 3 cm gives good results.

Stay with the patient to follow his changing needs until he has become accustomed to the mask and to positive pressure.

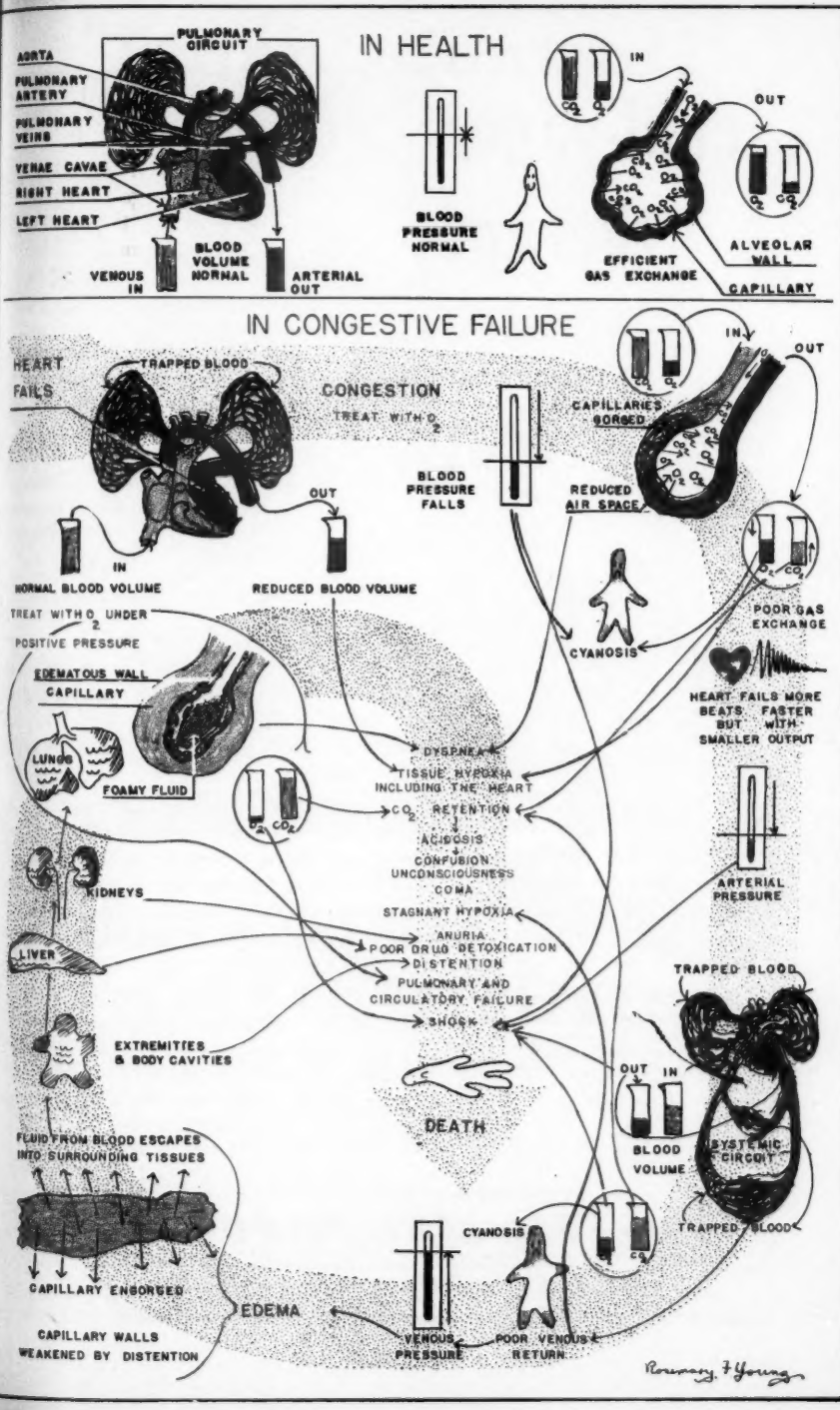
Having achieved a satisfactory response, the therapy should be maintained for a period of half an hour to an hour, or longer if necessary, in order to get the fullest remission of symptoms. There should be, perhaps, short periods during which the mask is removed and the patient allowed to rest, but *it is extremely important that the patient be "weaned" from positive pressure stepwise,* rather than just taken off abruptly. Again and again we've seen the mask taken off a patient who was exhaling against 3 or 4 cm of water pressure, only to find that in about 15 or 20 minutes the patient is right back in pulmonary edema again.

Therapist can advise

Here the therapist is in a situation where he can offer some advice to the physician. The therapist's words, wisely chosen and presented at the proper time, may be the measure to save a patient's life. Wean the patient by following as a guide, a reduction of 1 cm of pressure per hour.

Be guided by the response of the patient. Somebody should be delegated to make it a special point to check on the patient several times during the first hour or two after taking off the mask, to be sure he is not slipping back into pulmonary edema again.

It must be remembered that oxygen does not *cure* the heart disease, but merely alleviates some of its worst manifestations. However, by doing this, the heart is given a little rest, during which Nature can often repair much of the damage. ▸


IN HEALTH
PULMONARY CIRCUIT
AORTA
PULMONARY ARTERY
PULMONARY VEINS
VENAE CAVAE
RIGHT HEART
LEFT HEART
VENOUS IN
BLOOD VOLUME NORMAL
ARTERIAL OUT
BLOOD PRESSURE NORMAL
IN
OUT
EFFICIENT GAS EXCHANGE
ALVEOLAR WALL
CAPILLARY
IN CONGESTIVE FAILURE
HEART FAILS
TRAPPED BLOOD
CONGESTION
TREAT WITH O_2
OUT
IN
NORMAL BLOOD VOLUME
REDUCED BLOOD VOLUME
BLOOD PRESSURE FALLS
CAPILLARIES GORGED
REDUCED AIR SPACE
IN
OUT
POOR GAS EXCHANGE
CYANOSIS
HEART FAILS MORE BEATS FASTER BUT WITH SMALLER OUTPUT
TREAT WITH O_2 UNDER POSITIVE PRESSURE
EDEMATOUS WALL
CAPILLARY
LUNGS
FOAMY FLUID
DYSPNEA
TISSUE HYPOXIA INCLUDING THE HEART
CO_2 RETENTION
ACIDOSIS
CONFUSION
UNCONSCIOUSNESS
COMA
ARTERIAL PRESSURE
KIDNEYS
STAGNANT HYPOXIA
ANURIA
LIVER
POOR DRUG DETOXICATION
DISTENTION
PULMONARY AND CIRCULATORY FAILURE
SHOCK
TRAPPED BLOOD
EXTREMITIES & BODY CAVITIES
OUT
IN
DEATH
BLOOD VOLUME
SYSTEMIC CIRCUIT
TRAPPED BLOOD
FLUID FROM BLOOD ESCAPES INTO SURROUNDING TISSUES
CYANOSIS
CAPILLARY ENGORGED
EDEMA
CAPILLARY WALLS WEAKENED BY DISTENTION
VENOUS PRESSURE
POOR VENOUS RETURN
Rosemary F Young

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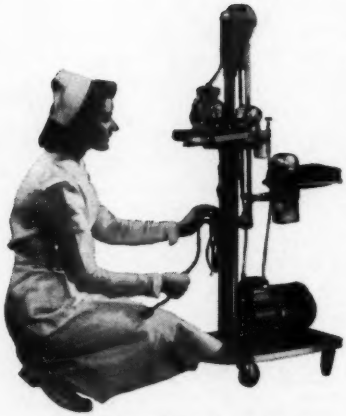

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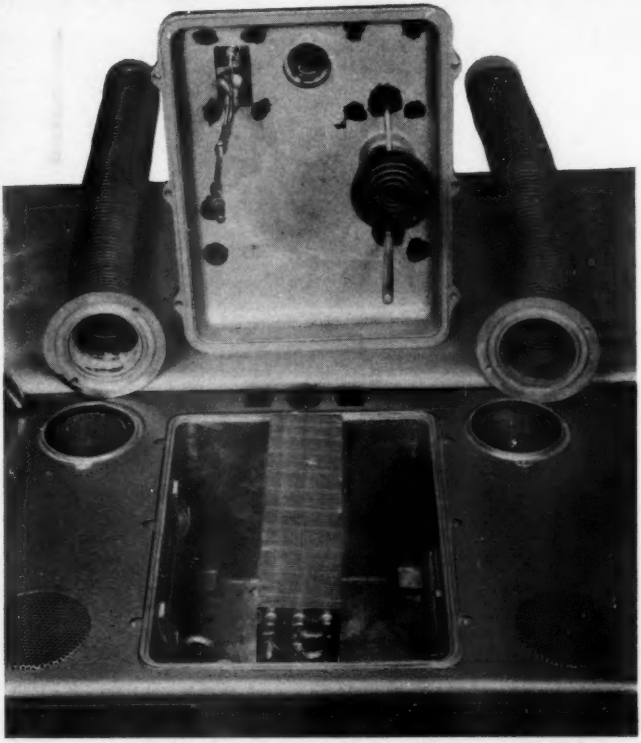

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Albert Carrière, executive director of the American Association of Inhalation Therapists, presents the new South Texas Chapter charter to Mrs. Faye Mayberry, St. Joseph's Hospital, Houston. Mrs. Mayberry was elected the chapter's first president.

CHAPTER ACTIVITIES

by Jack Sangster

TEXAS now sports a chapter! Since last issue of the Journal, a group of doctors, medical technicians and representatives of industry met at St. Joseph's Hospital in Houston to form the **South Texas Chapter** of the AAIT.

Therapists elected to office for the first year are: President: Mrs. Faye Mayberry, St. Joseph's Hospital, Houston; first vice-president, Mrs. H. T. Eason, St. Mary's Hospital, Port Arthur; second vice-president, Albert Johnson, M. D. Anderson Hospital, Houston; secretary-treasurer, L. V. Inscore, St. Joseph's Hospital, Houston.

Medical advisers to the group are Dr. Alvis E. Greer, the Greer Clinic, Houston; and Dr. Stewart Wilber, M.D. Anderson Hospital.

Four representatives from industry will serve in a liaison capacity on the steering committee. Representing the oxygen service companies will be J. D. Armstrong, Acme Medical Gases; Baxter Drury, Superior Oxygen Service; J. N. McCarroll. Big Three Welding Equipment Co.; and W. C. Kinser, the Linde Co.

The **Western New York Chapter** held its September meeting at St. Mary's Hospital in Rochester. A tape of an address on "Inhalation Therapy" by Dr. Edwin Levine was played, and this was followed by a discussion led by Dr. Charles Mathews, one of the Chapter's advisers. Plans were begun for an Institute on Inhalation Therapy to be presented jointly with the Western New York Hospital Council in January on the day of the chapter's annual meeting.

Boston Chapter activities have included a talk on emphysema by Dr. Francis L. Colpoys, workshop demonstrations on tents, emergency respiration equipment, IPPB apparatus and the raincoat chest assistor. President Ed Banks gave a short history of the ether dome of the Massachusetts General Hospital, where the first public demonstration of ether anesthesia was performed in October 1846.

Greater Montreal Chapter held its September meeting at Royal Victoria Hospital. There was considerable discussion of finances, and it was decided to raise dues.

see Chapters—page 34

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THE EDITOR'S CORNER

"Oxygen Given by Orderly"

"Death Laid to Mistake"

THESE were the headlines given by the NEW YORK MIRROR on August 28th to a story which serves to point up how important it is that inhalation therapy be administered by experienced and competent personnel instead of just by the nearest convenient person.

The accident occurred in a New Jersey hospital. The patient had had an overdose of barbiturates pumped from her stomach via a Levine tube which was still in place. Her doctor ordered oxygen and a nurse relayed the order to an orderly who applied a mask over the patient's face and the tube. Oxygen entered the Levine tube and fatally ruptured her stomach.

In a similar case a few years ago, a nurse accidentally connected an oxygen hose directly to a Levine tube, under the impression that it was a nasal oxygen catheter. The patient died the same way.

There will never be anything to protect patients from personnel who do not use their eyes and their brains; but the mistaken identity error *can* be prevented by insisting that catheter oxygen always enter the patient through a *green* tube, and that no green tubing should be used for any other purpose around a patient's head except oxygen.

RLF Correction

My attention has been called to an error in our September article on Retrolental Fibroplasia. Among the points on which it was indicated that "all" investigators concur, regarding prevention of RLF, there is disagreement about duration of treatment with oxygen and rate of withdrawal from it (INHALATION THERAPY, September 1958, p. 15, item 3).

There has been controversy about this (as well as about the exact mechanism by which RLF develops) for several years; and it was an oversight not to present the more recent view of Dr. Arnall Patz and others (**Pediatrics**, March 1957), that *withdrawal from oxygen should be prompt*. Dr. Patz says:

"Rate of Withdrawal from Oxygen: Szewczyk and Bedrossian and coworkers have claimed that prolonged gradual withdrawal from oxygen reduces or prevents the damaging effect of the initial exposure of the premature infant to oxygen. Recent controlled studies on mice in our own laboratory and by Hellstrom in Sweden have shown that gradual withdrawal from oxygen does not prevent ocular lesions developing in the mouse eye. In our own studies it was demonstrated that on the contrary, gradual withdrawal frequently increased both the severity and frequency of ocular lesions. These mouse experiments showed that the additional oxygen that was administered in the period of gradual withdrawal from oxygen frequently represented the added amount of oxygen that was necessary to make an initial nontoxic exposure injurious to the animal eye. These animal data suggest the possibility that this same situation may occur with prolonged gradual withdrawal of a premature infant from oxygen."

see Editor—page 34

ABSTRACTS

"Effect of Unilateral CO_2 Breathing on Pulmonary Blood Flow," by Richard M. Peters, in *Am. J. Physiol.* **191**:399, 1957.

Dr. Peters has previously studied effects on pulmonary blood flow of atelectasis of one lung and of breathing N_2 in one lung (in each case, the other lung was normal and breathing air). He found that the decrease in amount of blood perfusing the lung was greater during atelectasis than during N_2 breathing. This interesting difference was thought to be due to fact that in atelectasis the blood returning from the unventilated lung has an abnormal high pCO_2 as well as a low pO_2. So the present study was designed to investigate effects of CO_2 directly.

Each lung (study was done on dogs) was ventilated independently with the chest open. Elaborate measurements of pressures and concentrations were made in both lungs, pulmonary arteries and veins, femoral artery, etc. Extensive calculations of these data reveal that in all but 2 of 11 dogs, the pulmonary vascular resistance (and therefore blood pressure) fell in the lung breathing high CO_2 concentrations, and blood flow to that lung was hence increased.

This dilatation of vessels in CO_2-breathing lung is a local effect of CO_2, however, and CO_2 is known to cause vasodilation locally in other regions. Its *general* systemic effect, on the other hand, is to raise the blood pressure by means of vasoconstriction mediated by the vasomotor centers of the brain.

"Studies of Respiratory Physiology in Children," by Hellieson, Cook, Friedlander and Agathon, in *Pediatrics* **22**:80, 1958.

This group working in the Children's Medical Center of Boston has prepared tables of "normal" values for children from ages 5-17 of the following: vital capacity, residual volume, functional residual capacity, total lung capacity, lung compliance, flow resistance and end-expiratory intrapleural pressure.

Heretofore, not much information was available on children, so this will be a valuable reference for those working with pediatric respiratory disorders.

"Respiratory Phenomena in the Newborn," by Donald, Kerr and McDonald, in *Scottish Med. J.* **3**:151, 1958.

This article is eminently readable and interesting. It tells of experiments done by these doctors in a big maternity hospital in Glasgow in attempts to measure some of these phenomena not only in term but premature infants as well. It also discusses their efforts at "augmented" respiration, the point being made that "one truly augmented breath is worth very many artificial breaths that do not synchronise with diaphragmatic systole." The description of the respirator they use for this assistance is unfortunately incomplete, but several interesting features of it are mentioned.

"IPPB as an Adjunct in Rehabilitation of Thoracic Surgery Patients," by Anderson and Aronstain, in *Diseases of the Chest*, **30**:168, 1956.

In this study, patients undergoing chest surgery were given breathing exercises or exercises plus IPPB post-operatively, and vital capacity mesurements made to compare with pre-operative values.

Those given IPPB treatments regained their pre-operative capacities sooner than those given exercises only.

"Chest Physiotherapy during Intermittent Positive Pressure Respiration," by Opie and Spalding, in *Lancet*, 27 Sept. 58.

These workers find that physiotherapy is an effective means of getting secretions up high enough to be sucked out. It consists of "vibration" plus squeezing of the chest while in postural drainage positions, and applied during each expiration.

They do not elaborate how the vibration is applied, but it immediately precedes the squeezing. The squeeze is sudden and occupies only about three fourths of a second at the beginning of expiration.

They feel that the "benefits of physiotherapy are due to direct squeezing of the part of the lung beneath the physiotherapist's hands, not to a general increase in the rate of expiratory flow." With a bronchoscope it is possible to actually see the secretions being squeezed into the bronchi by this manoeuver.

see Abstracts—page 34

***Chapters*—from page 28**

The **Florida Inhalation Therapy Association** is planning a symposium to be held in the near future. In discussion of the AMA-recommended essentials for the establishment of training schools for therapists, the proposal was made that an examination schedule be set up for those already working in the field, in order to check on their qualifications. It was further suggested that possibly a scheme could be developed whereby some credit towards educational requirements could be earned by attendance at educational meetings.

Recent **Ohio Chapter** meetings have featured talks on resuscitation by Dr. Carolyn Ziegler, "Physiological Basis for Oxygen Therapy" by Dr. James Matson, and "Possibility of Infecting Patients by Contaminated Oxygen Therapy Equipment," by Dr. C. R. Macpherson (See September, 1958, INHALATION THERAPY).

***Abstracts*—from page 33**

"Physiological Meaning of Maximal Oxygen Intake Test," by Mitchell, Sproule and Chapman, in *J. Clin. Invest.* 37:538, 1958.

These workers are interested in finding a test which gives an indication of cardiovascular fitness. In selecting the maximal oxygen intake test, they realize that pulmonary insufficiency could cause a poor showing on the test, but assuming that pulmonary function is sound, the outcome of the test depends on circulatory system.

The maximal oxygen intake test consists of subjecting the patient to a series of graded work loads, while simultaneously measuring a number of variables. The expired air is analyzed, venous and arterial blood samples are analyzed, the blood circulation time is measured by a dye dilution technique. From all these measurements, the cardiac output, the oxygen consumption, arterio-venous (AV) difference in oxygen content and other values can be calculated.

It is shown that as the workload under which the subject labors is increased, so are his oxygen intake, cardiac output and AV oxygen difference—up to a maximum value for each. The maximal oxygen intake (i.e., further more vigorous work does not result in any greater oxygen intake rate beyond this value) is essentially limited by the extents to which the individual can increase his cardiac output and AV oxygen difference.

Their findings were that the oxygen intake increased nearly 10 times in going from rest to hard work. This was accomplished by increasing the cardiac output slightly over four times and the AV oxygen difference by over two times. The increase in cardiac output was achieved by increasing about equally the heart rate and the volume of blood pumped per stroke. The difference between oxygen contents of arterial and venous bloods was made greater almost entirely by a diminution of the oxygen content of venous blood. (In other words, more oxygen being taken out of blood as it passes through tissues.)

***Editor*—from page 32**

Terminology

For some years I have been pointing out to those who think "Inhalation Therapy" is a snooty term for "Oxygen Therapy" that our specialty now embraces so much more than the mere dispensing of oxygen that it is only fair to use a more inclusive term. After all, there are many instances nowadays when oxygen doesn't enter into the picture at all—except for the 20% in air!

However, there is question as to whether Inhalation Therapy is a sufficiently accurate designation. Dr. H. A. Bickerman's editorial in this issue discusses some of the fascinating developments just around the corner which are likely to make the term inadequate and outmoded. Perhaps "Respiration Therapy" would fit more closely, except that, as the doctor points out, sometimes it will be a diagnostic rather than a therapeutic procedure.

Whatever the title finally bestowed on our growing field, the need for revision, and for revision of revisions, is a healthy sign of expansion and development.

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continued from page 15

eight hours without help. And remember, it takes more than a year to do a thorough job of training field personnel.

Only when all these fundamentals have been accomplished is your company ready to take a full schedule of service. A well-run profitable territorial oxygen therapy service takes from one to three years to build, and then constant attention.

Learning and progress never stop. You must always keep well-informed on new procedures, new equipment, training, teaching and demonstrating.

After a reasonable time, leading hospitals will be asking for advice and be very interested in getting qualified AAIT members for therapists as soon as they can.

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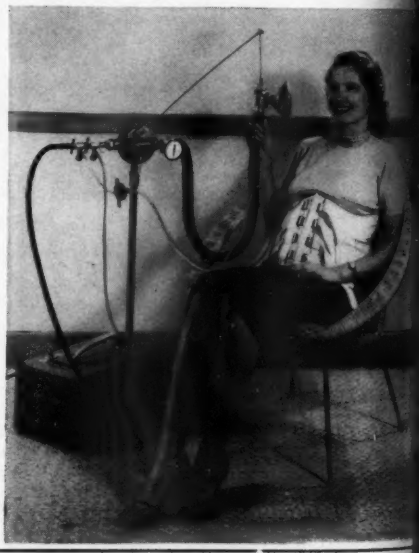

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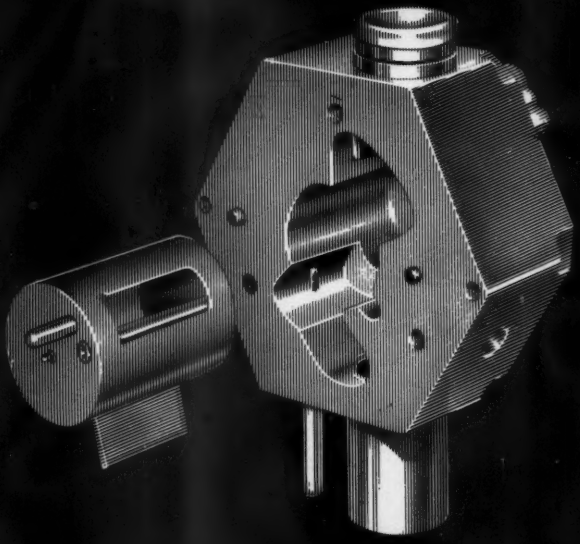

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